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UNDERGROUND STORAGE OF RECOVERABLE WATER SYSTEMS: A MANAGEMENT TOOL FOR CONJUNCTIVE USES OF SURFACE WATER AND GROUNDWATER IN AN ARID REGION

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Conjunctive use of surface and groundwater becomes one of important strategies of water supply management that should be considered to optimize the water resources development, management and conservation within a basin, especially in arid regions such as the southwestern United States. An underground storage of recoverable water system is certainly one of the tools to be used for that purpose. Several hydrologic aspects need to be carefully studied before implementing a program of conjunctive use of surface and groundwater: underground storage availability; production capacity of the aquifer in term of potential discharge; natural recharge of the aquifer; induced natural recharge of the aquifer; and potential for artificial recharge of the aquifer. In this paper, the authors presented the underground storage of recoverable water system as a framework that consists of subsystems: source of water, recharge venue or facilities, storage space, and recovery facilities depending on intended uses of water. All subsystems interact with each other and depend on each other. The sources of water include flood water and runoff. Excess surface water can be recharged by surface spreading, vadose zone wells, deep recharge wells or aquifer storage and recovery (ASR) wells. Storage capacities vary with hydrological properties of the geological formation and boundary conditions of the aquifer. Stored water can be recovered by production wells, an ASR well itself or simply by increasing baseflow of the neighboring streams. The stored water can be used for seasonal or long-term municipal and industrial supplies, supplemental agricultural applications or maintaining required environmental flows.

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